

AMENDMENTS TO THE CLAIMS

The following includes a complete set of pending claims including markups.

Please amend Claims 1, 4, and 13.

Please add Claims 14-20.

1. (currently amended) An actuator for scanning detecting light, comprising:
an optical element for emitting detecting light;
a moveable part supporting the optical element;
a sheet spring having a fixed end and a moveable end supporting the moveable part for a movement of the moveable part along a substantially arcuate path centered about the fixed end of the sheet spring through a bending deflection of the sheet spring; and
drive means for driving the moveable part along the substantially arcuate path so as to scan the detecting light.
2. (original) An actuator for scanning detecting light according to claim 1, wherein the drive means is provided with a plurality of drive force generating units disposed on either side of the optical element in such a manner that the combined force of the drive force produced by the drive force generating units acts substantially onto the gravitational center of the optical element and moveable part.
3. (original) An actuator for scanning detecting light according to claim 1, wherein the drive means consists of an electromagnetic force generating unit, and the moveable part comprises an electromagnetic coil.
4. (currently amended) An actuator for scanning detecting light according to claim 1, wherein the optical element comprises ~~one of~~ a member selected from a group consisting of a mirror for reflecting detecting light emitted from a laser light emitting means, a prism for refracting detecting light emitted from a laser light emitting means, a hologram element for reflecting detecting light emitted from a laser light emitting means, and a detecting light emitting device.

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5. (original) An actuator for scanning detecting light according to claim 3, wherein the sheet spring is connected to a fixed part via a flexible circuit board including a circuit for supplying electric current to the electromagnetic coil.
6. (original) An actuator for scanning detecting light according to claim 3, wherein the sheet spring is provided with a laminated structure including an electrically insulating layer and an electrically conductive layer serving as a circuit for supplying electric current to the electromagnetic coil.
7. (original) An actuator for scanning detecting light according to claim 3, wherein a vibration control member is affixed to the sheet spring at a part where a relatively large strain is produced in a resonant vibration.
8. (original) An actuator for scanning detecting light according to claim 1, wherein the drive means consists of an electromagnetic force generating unit for driving the moveable, and the sheet spring comprises a plurality of sheet spring members disposed one next to another in a major plane of the sheet spring members, the electromagnetic force generating unit being disposed between the sheet spring members.
9. (original) An actuator for scanning detecting light according to claim 8, wherein the each of the sheet spring members has a width which gets narrower from the fixed end to the moveable end.
10. (original) An actuator for scanning detecting light according to claim 8, wherein the electromagnetic force generating unit comprises an electromagnetic coil attached to the moveable part, the coil receiving a supply of electric current via a circuit partly formed by the sheet spring members.
11. (original) An actuator for scanning detecting light according to claim 8, wherein the electromagnetic force generating unit comprises a yoke attached to the fixed part, the yoke including a C-shaped member which is folded onto itself to define a gap for receiving the electromagnetic coil.

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12. (original) An actuator for scanning detecting light according to claim 8, wherein the electromagnetic coil is provided with an annular shape, and the yoke is attached to the fixed part so as to extend along the direction of movement of the moveable part and partly fitted into the electromagnetic coil,

the fixed part being provided with a guide part for guiding the yoke when fitting the yoke into the electromagnetic coil along the direction of movement of the moveable part and attaching the yoke to the fixed part.

13. (currently amended) An actuator for scanning detecting light according to claim 8, wherein the optical element comprises a member selected from a group consisting of:

a mirror for reflecting detecting light emitted from a detecting light emitting means;

a prism or lens for changing the optical direction of detecting light emitted from a detecting light emitting means;

a hologram for reflecting detecting light emitted from a detecting light emitting means; and

a detecting light emitting means itself.

14. (new) An actuator for scanning detecting light according to claim 1, wherein the electromagnetic force generating unit comprises a yoke extending along the arcuate path and attached to a fixed part, a magnet for supplying magnetic flux to the yoke, and an electromagnetic coil attached to the moveable part and receiving the yoke in a central bore thereof.

15. (new) An actuator for scanning detecting light according to claim 1, wherein the electromagnetic force generating unit comprises a pair of yokes extending along the arcuate path in a mutually parallel relationship and attached to a fixed part, a magnet for supplying magnetic flux to the yokes, and a pair of electromagnetic coils attached to opposing ends of the moveable part and each receiving a corresponding one of the yokes in a central bore thereof.

16. (new) An actuator for scanning detecting light according to claim 14, wherein the yoke includes a C-shaped member which is folded onto itself to define a magnetic gap for receiving a part of the electromagnetic coil.

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17. (new) An actuator for scanning detecting light according to claim 14, wherein the sheet spring comprises a pair of sheet spring members disposed one next to another in a major plane of the sheet spring members, the two sheet springs providing an electric path for the electromagnetic coil.
18. (new) An actuator for scanning detecting light according to claim 14, wherein the sheet spring is provided with a laminated structure including a pair of electroconductive strips electrically connected to the electromagnetic coil and an insulator for providing electric insulation to the electroconductive strips.
19. (new) An actuator for scanning detecting light, comprising:
an optical element for emitting detecting light;
a moveable part supporting the optical element;
a sheet spring having a fixed end and a moveable end supporting the moveable part;
and
drive means for driving the moveable part along a substantially arcuate path centered about the fixed end of the sheet spring so as to scan the detecting light.
20. (new) An actuator for scanning detecting light, comprising:
an optical element for emitting detecting light;
a moveable part supporting the optical element;
a sheet spring having a fixed end and a moveable end supporting the moveable part for a movement of the moveable part along a substantially arcuate path centered about the fixed end of the sheet spring; and
drive means for driving the moveable part so as to scan the detecting light.